THE AMERICAN JOURNAL OF

OPHTHALMOLOGY.

VOL. VII. MAY, 1890. No. 5.

THE USE OF SKIASCOPY (*The Shadow Test*) IN THE DETERMINATION OF REFRACTIVE ERRORS.

BY H. V. WÜRDEMANN, M.D., OF MILWAUKEE, WISCONSIN.

Without going into details in regard to the optical principles of skiascopy, I will endeavor to point out some of its advantages and applications in the determination of those forms of ametropia which require exact correction by lenses. The subject has crept into all recent text-books and works upon the eye, although in some of them[1] totally inaccurate and misleading descriptions of the procedure are given.

For a complete description of the principles involved in this method of testing the refraction of the eyes, I will refer to the

[1] "Traité des Maladies des Yeux." Galezowski, 3d edition. Paris: J. B. Ballière, 1888, p. 824.

"A Manual of the Diseases of the Eye," MacNamara, 4th edition. Philadelphia: P. Blakiston, Son & Co., 1882. Pp. 502–504.

paper of Swan M. Burnett on Skiascopy,[2] published in 1888, and the same author's more pretentious work on Astigmatism.[3]

Skiascopy, like all other valuable inventions, has received its full share both of condemnation and approval. The Germans affect to look down upon the method and do not seem willing to give it even a fair trial.[4] Such men as Fuchs, Königstein and Stellwag, of Vienna, Schweigger and Hirschberg, of Berlin, insist that the direct method of ophthalmoscopic observation is "*good enough*" for them. In discussing this subject with one of these same gentlemen, in the autumn of 1889, in the latter's clinic, he picked up an ophthalmoscope and at a distance of 20–25 cm. (8–10 inches) from the patient's eye he twisted and turned the mirror up and down, from side to side, and remarked that he "saw no shadow." Well, how could he?

Although this method of objective optometry originated in France,[5] it has not yet in that country been awarded the place it merits. In England[6] the shadow test is in use, although observers generally adhere to the slow and tedious method of the trial frame and lenses. It is true that the English use an apparatus, but this is so clumsy and patience-tiring in application that the chief use of the *machine* seems to be in ornamenting shelves where other relics of the past are stored. In the Eastern States[7] skiascopy is generally used, but in the West very little is known of it.

By this method of optometry one can determine at the first glance as to a patient's ametropia and can in a moment decide

[2]"Skiascopy or the 'Shadow' Test for the Determination of the Refraction of the Eyes." Burnett, The Medical News, Sept. 15, 1888.

[3]"A Treatise on Astigmatism." Burnett, J. H. Chambers & Co., St. Louis, 1887.

[4]During my residence in Vienna in 1889, I had the satisfaction of teaching the use of skiascopy to a number of Germans and Americans in the course of a series of lectures on Refraction.

[5]The "Shadow" test was discovered by Cuignet in 1873, and was named incorrectly "*Keratoscopie*" (see Recueil d. Ophthalmologie, 1873.)

[6]The English term this method "*Retinoscopy*," another incorrect name.

[7]The term proposed by M. Egger and brought into prominence by Burnett.

whether the subject is myopic, hypermetropic or astigmatic. Almost my first procedure where ametropia is suspected is to escort the patient into the dark room, where by skiascopy the *kind* and degree of optical defect may be quickly decided.[8] Much useless testing by plus and minus glasses is thus avoided. By the shadow test complete glasses are easily fitted to the most dense person or to children.

By the use of skiascopy in conjunction with the direct ophthalmoscopic method and the test lenses, glasses can be fitted to any one with little or no questioning. Thus not only time but temper is saved. "This method is founded upon the observed fact that when the light from a flame, placed in the ordinary position for ophthalmoscopic examination, is thrown into the eye at a distance of from 3 to 5 feet from the eye, and the mirror is rotated about one of its axes, a shadow is observed to pass across the bright area of the pupil and the direction and rapidity with which the shadow moves serve as a basis for diagnosis."[9]

In emmetropia, hypermetropia and myopia under .75 D., (using the *concave* mirror of the ophthalmoscope) the movement is *against* the rotation of the mirror.

In myopia over .75 D. the movement is *with* the rotation of the mirror. The greater the degree of ametropia the slower the movement and the less brilliant is the image.

The accompanying table exhibits the changes in the appearance of the image, when the *concave* mirror of an ophthalmoscope is used at a distance of one meter from the eye.

[8]A rough method, "first suggested by Chibrte, but also by Jackson, of Philadelphia, is to move the mirror toward the eye under examination until the point of reversal is found; then the distance from the observed to the observing eye marks the far point of the eye under examination." From Burnett on Skiascopy, The Medical News, Sept. 15, 1888.

[9]Burnett, "A Treatise on Astigmatism."

Refraction.	*Direction of Movement.*	*Rapidity of Movement.*	*Brilliancy of image.*
Emmetropia: - - -	Against	Rapid.	Brilliant.
Hypermetropia:			
a; of low degree, -	"	Less Rapid.	Less brilliant
b; of high degree, -	"	Slow.	Dull.
Myopia:			
a; of less than .75 D.,	"	Very rapid.	More brilliant.
b; of .75 D., - -	- - -	- - -	Most brilliant.
c; of low degree above .75 D., - - -	With	Less rapid.	Less brilliant.
d; of high degree, -	"	Slow.	Dull.
Astigmatism:			
a; Hypermetropic,			
(simple), - -	Against in both meridians,	Slower in one meridian than in the other.	Edge of image less defined in one meridian than in the other.
(compound), -	"	"	"
b; Myopic,			
(simple) to .75 D., -	"	"	"
(simple) over .75 D.,	Against in emmetropic and with in astigmatic merid'n	"	"
(compound), both meridians under .75 D.,	Against in both meridians	"	"
one meridian under, one over .75 D., -	Against in meridian under .75 D. and with in meridian over .75 D.	"	"
both meridians over .75 D., - -	Both meridians with.	"	"
c; Mixed,			
under .75 D. of Myopia, - - -	Both against.	- - -	- - -
over .75 D. of Myopia,	One meridian with, the other against.	- - -	- - -
d; Oblique, - -	Oblique.	- - -	- - -

When the *plane* mirror is used these appearances are reserved. In Emmetropia, Hypermetropia and Myopia under 75 D., the movement is *with*, and in Myopia over 75 D., *against* the rotation of the mirror.

It will be noticed that 75 D. of Myopia is taken as a standard; and that, by reducing the appearances exhibited under the shadow test by all forms of Ametropia to those given by a Myopia of that degree,[10] we are enabled to measure all forms of refractive errors. To do this it is necessary to place and replace lenses in the front of an eye until these appearances are produced. Either a trial frame and test lenses (the placing and replacing of which consumes a great deal of time), or a disk containing the proper lenses rotated in front of the eye, must be used.

Mr. Doyne, of Oxford, in the Ophthalmic Section of the International Medical Congress, held in Washington, in 1887, exhibited a disk for Skiascopy, or as he called it "Retinoscopy." This was an immense *machine*. I saw several of these affairs in London but they seemed to be seldom used.

At the Ophthalmic Section of the American Association held in Washington, in September, 1888, Dr. Burnett, of that city, exhibited a simple disk of hard rubber, containing twenty-five lenses, which was intended for use in Skiascopy. This apparatus swung upon an elbow and could be screwed to the wall of the dark room. A modification of these instruments is what I have to offer in the following:

This apparatus consists of a hard rubber disk, 4 mm. in thickness, 30 cm. in diameter, in which are concentrically placed twenty-four lenses as follows:

Plus: .25; .50; .75; 1; 1.25; 1.50; 2; 2.50; 3; 4.50; 6; 8.

Minus: .25; .50; .75; 1; 1.35; 1.50; 2; 2.50; 3; 4.50; 6; 8.

The disk revolves upon a pivot connected with brass bar[11] which is attached to the wall of the dark room and is easily

[10] A normal eye may be made .75 D. Myopic by placing a plus .75 in front of it.

[11] The disk may also be attached to a movable stand, for the convenience of those who have no dark room.

swung out of the way when not in use. By means of a screw which can be loosened, the disk may be lowered or raised to suit height of any patient for sitting or standing examination.

In the rear of the disk, extending to either side is an angular piece of hard rubber, large enough to cover three lenses, with an aperture in the center, thus permitting the patient to look

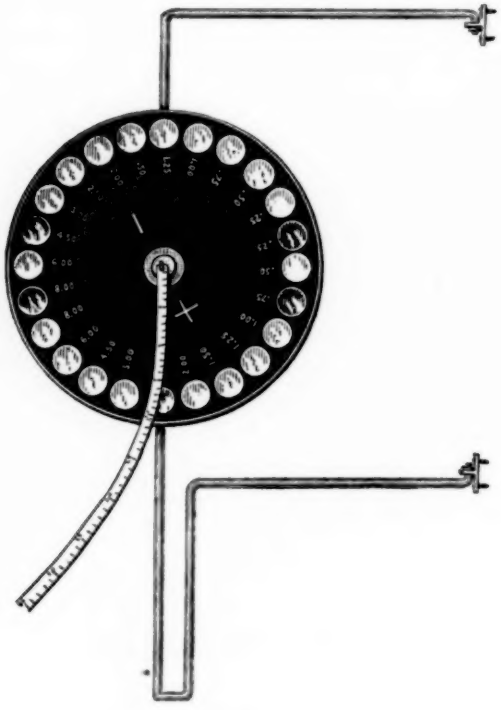

FIG 3.—FRONT OF SKIASCOPE.

through the lens desired and precluding the possibility of his using the wrong one. This piece is fastened and does not revolve with the disk.

Between the stationary piece and disk is a clip in which additional lenses may be fastened. Attached to the aperture is a rim or flange of hard rubber arranged to fit the socket of the

eye, thus permitting no ray of light to fall upon the eye, excepting that cast by the mirror in the hands of the surgeon.

A meter tape attached to the center of disk, allows the exact distance from the patient's eye to be taken. The illumination is an Argand burner attached to a universal joint.

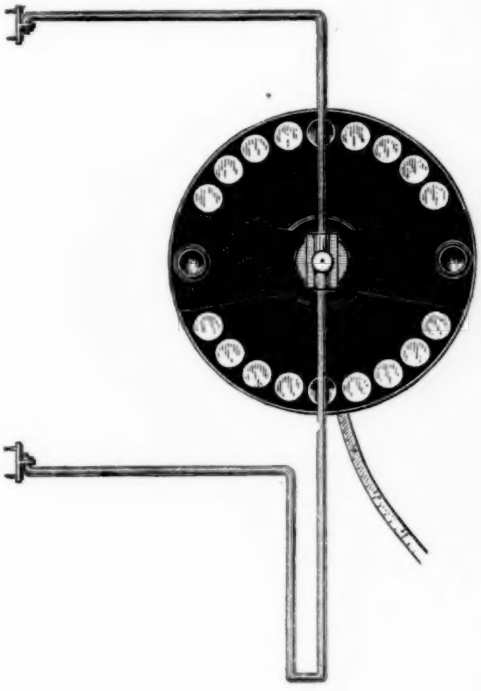

FIG. 4.—REAR OF SKIASCOPE.

In using the disk the first step is to lower or raise it to suit height of patient.

Second: To adjust the lens to right eye. Patient rotates disk backward or forward with right hand. In examination of left eye, patient simply leans forward and operator brings disk into place, then leaning backward, patient's eye is in position. Disk is then rotated with the left hand, and the operator moving back one meter, proceeds with the examination.

By means of the clip one is enabled to obtain all the combinations of lenses which are necessary for correction of ametropia. In using apparatus, I sometimes insert + .75 D. in the clip which obviates the necessity of adding for myopia, or subtracting for hypermetropia. Homatropin is used where dilatation of the pupil or inhibitation of the accommodation is required, although the flange on back of disk, fitting closely in

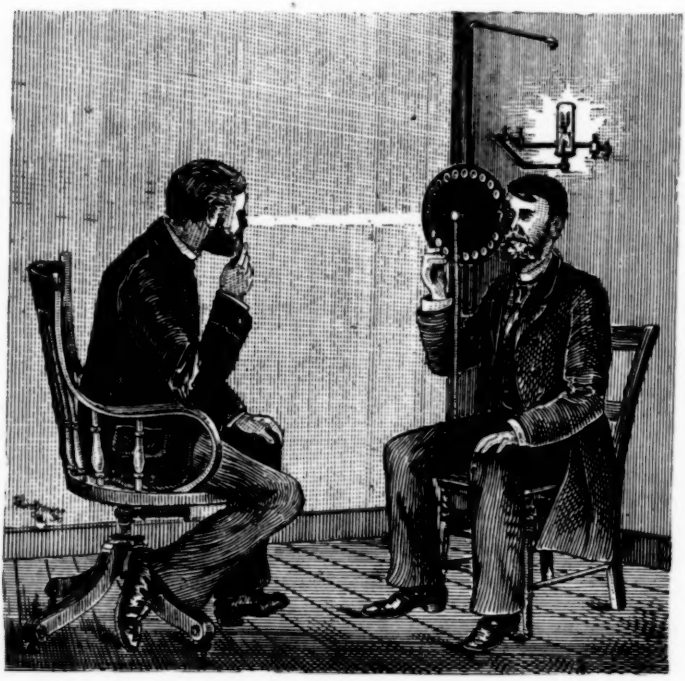

FIG. 5.—METHOD OF USING THE SKIASCOPE.

socket of eye, completely excludes extraneous light, and thus for skiascopy mydriatics are not usually indicated.

The skiascope was first made for me by Adolf Schwarz, Optiker, Spital Gasse, 4, Vienna, Austria.

I have made arrangements with Jas. A. Queen & Co., Opticians, of Philadelphia, Pa., from whom the disk can now be procured.

By skiascopy and the use of my disk I am able to measure *objectively* to .25 D. of ametropia.[12] In the determination of low degrees of refractive error I usually take the plane mirror. I do not restrict myself by any means to this one method, although it is invaluable. In examining patients for glasses, after the usual questioning I use the following method:

First. Inspection.

Second. In the dark room at 1 m. distance from eye of patient, I observe the *apparent brightness* of the lighted area of the fundus (using the *concave* mirror of the ophthalmoscope), then the *movement* of the shadow (against or with the mirror), the *rapidity* and the *angle* at which it appears to move.

Third. Examination of the fundus by the indirect method.

Fourth. Examination of the anterior structures by oblique illumination.

Fifth. Examination of the fundus by the direct method in which the refraction is determined and noted.

Sixth. Examination by skiascopy. Swinging the disk on its arm from the wall and commencing with .25 D. plus or minus (according as the shadow moves with or against the mirror), I proceed until a lens is reached which *neutralizes*, the next lens *reversing* the movement. In a case of myopia this lens is .75 D. weaker than the refraction of the eye. In hypermetropia it is the same degree stronger. For instance, a myopia of 1 D. will be neutralized by a —.25 D.; while a hypermetropia of 1 D. will require +1.75 D. Thus, in hypermetropia we *subtract* .75 D., and in myopia *add* .75 D. to the strength of the neutralizing lens. The vertical meridian is first examined and the results committed to paper, then the hori-

[12]Prof. Burnett, since the publication of his book on Astigmatism, has even enlarged his views upon skiascopy, and now considers it a most accurate method for the determination of refractive errors, particularly for those of a low degree.—(From a personal interview.)

zontal meridian, and lastly the oblique. (One meridian muts be dealt with at a time or confusion will result.)

Seventh. Examination with the trial lenses, test letters and diagrams in the light room (a procedure which has been greatly facilitated by the previous methods).

Eighth. Correction by skiascopy of lenses found, the patient wearing them in the trial frame.

Ninth. Correction by the direct ophthalmoscopic method.

Tenth. Trial by patient for reading and distance. The *objective* methods (direct examination and skiascopy) and the *subjective* method of examination are direct checks upon each other.

The record of the refraction in a case of simple myopic astigmatism is kept as follows:

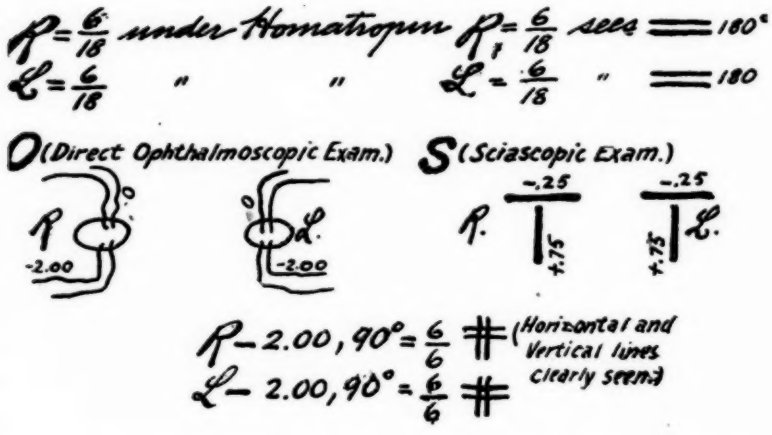

FIG. 6.

In a case of simple hypermetropia:

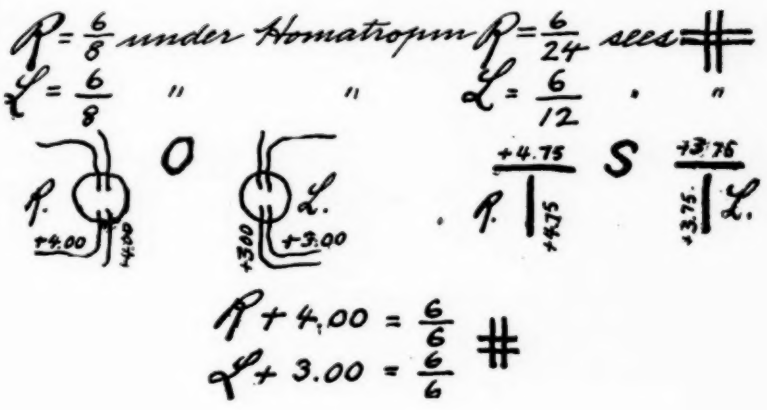

FIG. 7.

In a case of compound hypermetropic astigmatism with the axes oblique, the record is:

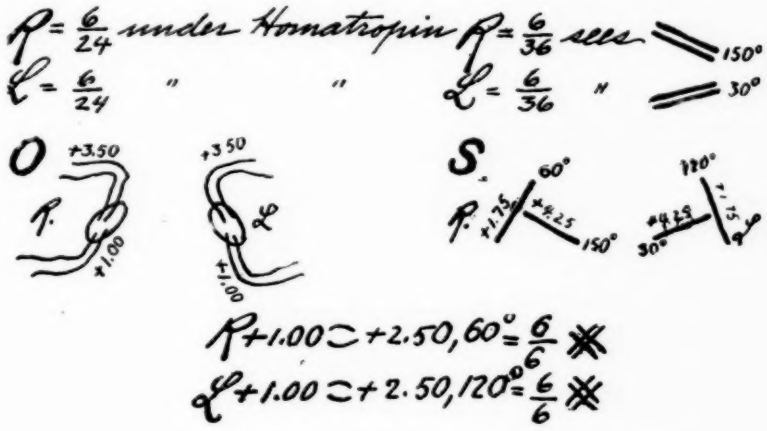

FIG. 8.

By observing these rules I am convinced that the proper correcting lenses can invariably be found.

REMOVAL OF PIECE OF STEEL FROM THE VITREOUS BODY WITH RECOVERY OF PERFECT VISION.

BY M. H. POST, M.D., ST. LOUIS.

The removal of a piece of steel from the vitreous body with a magnet is something of an old story; but the following result is so satisfactory and so exceptional, that the case may be of interest to some of your readers:

August 7, 1889, H. S., aged 18 years, was brought to our office one hour and a half after O. D. had been struck by a piece of steel, which had been knocked off from a hammer or a tool in the hands of a fellow-workman.

Examination of the eye showed a clean cut through the lower lid, near its center, and through the sclera, two and one half mm. long, and two mm. from and parallel with the corneo-scleral margin.

The ophthalmoscope showed a shining piece of metal with several air bubbles, in the upper portion of the vitreous, a little to the inner side and anterior to the intersection of the equator and the vertical meridian.

Owing to various causes operation was deferred till the next day. The conjunctival sac was washed out with the bichloride of mercury 1-5,000; atropia and cocain solution used and the eye dressed antiseptically.

The next morning the patient reported no pain; the eye was quiet and the ophthalmoscope gave no change from the day before; atropia and cocain solution again used. That afternoon the patient was placed under ether, a flap of conjunctiva was dissected from the inner quadrant of the globe, and a meridional incision was made just to the inner side of the insertion of the superior rectus. A Graefe cataract knife

was used, puncturing the sclera about one half inch from the corneo-scleral margin and cutting forward about one quarter of an inch, great care being taken not to puncture the lens.

The electromagnet was made in the ordinary way; a coil of wire, carrying a current from three bichromate of potassium cells, passing around a core of soft iron, into the end of which a soft iron point was screwed. The point used was flattened on both sides, instead of being cylindric or cone shaped.

Upon introducing the point, which had previously been allowed to lie in a solution of carbolic acid, into the vitreous a sharp click was heard, and a slight shock felt. Upon withdrawing it the piece of steel was found adhering to the point of the magnet. The piece of steel was four mm. long, two mm. broad and about one and a half mm. thick, and weighed a trifle over half a grain.

No vitreous was lost, the conjunctival sac was washed out with bichloride of mercury solution 1-5000; the conjunctival flap drawn over the scleral wound and held in place by stitches; the conjunctival sac was again washed out with the bichloride solution, and the eye dressed antiseptically.

August 11. Dressings removed, eye quiet, no pain, pupil widely dilated, media clear.

August 20. A few small floating particles in vitreous, slight infiltration of choroid at point of incision and in region where foreign body was lodged; slight infiltration at point where foreign body entered.

From this time the case progressed to perfect recovery and November 10, 1889 O. D. $^{14}/_{IX\cdot5}$.

It will be seen that the foreign body passed entirely through the eye and our remarkable success we attribute to the fact that neither the lens nor iris were injured, the absence of hæmorrhage into the vitreous, the promptness of the operation and the antiseptic precautions.

Dr. A. E. Ewing shared the care and responsibility of the management of the case equally with me throughout.

REPORT OF A CASE OF RECURRING EPITHELIOMA OF THE CORNEA; ENUCLEATION OF THE EYEBALL; NO RETURN OF THE GROWTH.

BY DAVID WEBSTER, M. D.,

(Prof. of Ophthalmology in the New York Polyclinic: Surgeon to Manhattan Eye and Ear Hospital, New York.)

On April 22, 1873, soon after I entered the office of the late Dr. C. R. Agnew as his assistant; he was consulted by Mr. J.P., æt. 71 years, married, an iron manufacturer, on account of a recurring growth upon his right cornea. Some four years previously a growth which was supposed to be pterygium had been removed by a surgeon in the city where he lived, and the same surgeon had excised a growth which had recurred in the same place some three years later. After the second operation a caustic had been applied to the site of the growth with a view of destroying any portions of the growth that had escaped the knife. Some inflammatory reaction followed the last operation and there was a discharge from the eye for four or five months, and then the growth began to appear again and had steadily increased.

The patient stated that the sight of the affected eye, which had never been nearly as good as that of the other, had begun to be obscured by the supposed pterygium about a month before its first removal, thus showing that it had encroached upon the cornea at that time.

When we saw him there was a fleshy looking growth extending horizontally across the cornea and leaving about two-fifths of its upper portion transparent. Through this transparent portion of the cornea it could be seen that the pupil

was clear and the iris uninvolved. There was also a very slight margin of clear cornea below. The conjunctiva on both sides of the tumor was injected and, on the nasal side, considerably thickened.

The secretions from the eye were ichorous and the skin of the lower eyelid was shining and excoriated.

The patient said that the eye had never been painful but had annoyed him much by itching and by feeling as though there was something in it.

Dr. Agnew made a diagnosis of "Recurring Epithelioma of the Cornea" and advised enucleation. This the patient assented to and, on the following day, the patient being under ether, Dr. Agnew, after having slit the external canthus, excised the eyeball with all of the ocular conjunctiva that seemed to be in the slightest degree involved in the disease. Nearly all the ocular conjunctiva having been removed, it seemed probable that the patient would never be able to wear an artificial eye. Moreover, Dr. Agnew feared that even if there should be a suitable cavity for an artificial eye, the wearing of one might produce a local irritation and induce a recurrence of the growth. He therefore concluded to seal up the cavity of the orbit, so as to prevent the inversion of the eye lashes and irritation of the stump. This he accomplished by scalping the tarsal borders from the outer canthus to the lachrymal puncta.

The patient had an attack of *cholera morbus* during convalescence, but the eye healed well, the cavity being permanently closed, all except a small opening at the inner canthus, which remained open for the escape of tears or other secretions.

A letter to Dr. Agnew, dated June 19, 1880, states that Mr. P.recently died of abscess of the anterior perineum "and that he never developed anything malignant after the removal of the eye." It is to be regretted that the eye was spoiled before it could be examined by the pathologist, but there can be little doubt of the nature of the growth.

A CASE OF SCLERO CORNEAL TUMOR.

BY FRANK TRESTER SMITH, A. M., M. D., CHATTANOOGA, TENN.,
Formerly Ass't. Surgeon New York Ophthalmic and Aural Institute.

Cases of sclero-corneal tumors are not rare but the following presents some unusual features so that its recital may be of interest:

J.V.Jordon, æt. 54, years Cleveland, Tenn., presented himself for treatment at the Chattanooga Medical College, Octobor 31, 1889, with the following history: A small blister appeared near the inner canthus of the right eye about December 1, 1888. This was not painful for two months but had neuralgia in the head during that time. At the end of two months the eye became painful, which was worse when he caught cold. The pain gradually increased and had been almost unendurable for the past two and a half months. Sleep was greatly interfered with and the other eye had become irritable and intolerant to light. Had been unable to do any work for six or seven months. Both eyes had been "sore" fifteen years before. This left the sight of the right eye somewhat defective. No history of cancer in the family. Mother died of consumption, also a sister. Two children died of diphtheria or croup. No evidence of any special dyscrasia.

An examination showed at the sclero-corneal margin near the inner canthus a tumor with a base about equal to the surface of the cornea. It covered the latter to about one-third of its extent. The surface was rough and of a dirty pearly color. At the apex some dark bluish pigment could be seen under the surface. The tumor was sessile. At no point could a small probe be passed under it. The surface could be readily indented as though it contained fluid. While passing a

probe over the apex the wall gave way and a bead of virtreous like fluid escaped. The curvature of the ball up to the edge of the tumor was normal. The appearance suggested an epithelioma covering. The ball very tender. Photophobia prevented a test of vision.

The left eye was intolerant of light and could not be used for any length of time without pain.

Enucleation of the right eye was advised and was performed before the class the next day. Healing was rapid and the patient was allowed to go home in five days and went to work nine days after the operation. In two weeks a glass eye was fitted on the stump which has been worn since. The symptoms were entirely relieved and the patient has felt better than he has for over a year. In this case the indications for the operation were the intense pain, the suspicious appearance of the tumor, and the symptoms of sympathetic irritation in the other eye, either one of which would have suggested enucleation.

Description of the Histological Conditions of the Tumor Described by Dr. F. T. Smith.

BY ADOLF ALT, M.D.

The speciment sent to me by Dr. Smith was probably one-quarter of the eyeball, with one-half of the tumor.

Macroscopical appearance.—What appears to be the tumor has a hollow base situated over the ciliary region. Iris, ciliary body, choroid and retina with some vitreous body are seen to enter a cavity forming the larger part of the tumor. There is no lens. It, therefore, makes the impression as if we had to deal with a ciliary staphyloma, caused by a trauma which had led to prolapse of the interior membranes through an opening in the sclerotic in the ciliary region. This looked so much like the simple explanation of the conditions found, that I was almost ready to return the specimen to the Doctor, telling him, that the tumor was simply a staphyloma. There was only one

condition which prompted me to make some microscopical sections, namely, the conjunctival covering, so to speak, the sac of the hernia, was comparatively thick and not smooth on its surface. After having embedded the specimen in celluloidin, I made a number of sections which revealed somewhat unusual conditions.

Microscopical examination.—Under the microscope it is at once clear that the macroscopical appearances were correct, as far as the prolapse of the internal membranes of the eye is concerned. In the—so to speak—hernial sac, the lining nearest the surface is formed by the choroid, which is not even very much altered, and the ciliary body and peripheral portions of the iris. In the cavity thus formed the retina and some remnants of the vitreous body are lying more or less loosely.

The most interesting part of the tumor is the outer covering of it. This latter consists almost totally of epithelial cells held within a very loose network of connective tissue. Pearl nodules are very frequent.

Thus, it is plain that we have, after all, before us an epithelial tumor. It is, however, of rather an uncommon appearance. The question now remains, which of the two conditions was the primary one, the epithelioma or the staphyloma? I am inclined to think the latter.

CORRESPONDENCE.

CENSUS OF HALLUCINATIONS.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—May I ask for the publicity of your pages to aid me in procuring co-operation in a scientific investigation for which I am responsible? I refer to the *Census of Hallucinations*, which was begun several years ago by the "Society for Psychical Research," and of which the International Congress of Experimental Psychology at Paris, last summer, assumed the future responsibility, naming a committee in each country to carry on the work.

The object of the inquiry is twofold: 1st, to get a mass of facts about hallucinations which may serve as a basis for a scientific study of these phenomena; and 2nd, to ascertain approximately the *proportion of persons* who have had such experiences. Until the average frequency of hallucinations in the community is known, it can never be decided whether the so-called "veridical" hallucinations (visions or other "warnings" of the death, etc., of people at a distance) which are so frequently reported, are accidental coincidences, or something more.

Some 8,000 or more persons in England, France and the United States have already returned answers to the question which heads the census sheets, and which runs as follows:

"Have you ever, when completely awake, had a vivid impression of seeing or being touched by a living being or inanimate object, or of hearing a voice; which impression, so far as you could discover, was not due to any external physical cause?"

The "Congress" hopes that at its next meeting, in England, in 1892, as many as 50,000 answers may have been collected. It is obvious that for the purely statistical inquiry, *the answer "No" is as important as the answer "Yes."*

I have been appointed to superintend the Census in Aemrica, and I most earnestly bespeak the co-operation of any among your readers who may be actively interested in the subject. It is clear that very many volunteer canvassers will be needed to secure success. Each census blank contains instructions to the collector, and places for twenty-five names; and special blanks for the "Yes" cases are furnished in addition. I shall be most happy to supply these blanks to any one who will be good enough to make application for them to Yours truly,

(Professor) Wm. James,

Harvard University. Cambridge, Mass.

"MONATSBLATTER F. AUGENHEILKUNDE."

Editor American Journal of Ophthalmology.—Herewith I announce to my friends and colleagues, and especially to the readers of the *Monatsblätter für Augenheilkunde*, that I moved my residence from Rostock to Munich, and I further ask them to please send all communications, letters and journals in future to Munich, Bavaria. W. von Zehender.

SOCIETY PROCEEDINGS.

AMERICAN MEDICAL ASSOCIATION.

List of Officers and Preliminary Programme of the Forty-First Annual Meeting.

Held at Nashville, Tenn., May 20, 21, 22 and 23, 1890.

Section of Ophthalmology.

Chairman.—S. C. Ayres, Cincinnati, O.

Secretary.—E. J. Gardiner, Chicago, Ill.

1. Address by the Chairman.

2. The Uses of Jequirity, by Wm. Cheatham, Louisville, Kentucky.

3. Jequirity in the Treatment of Diphtheritic Conjunctivitis, by A. E. Prince, Jacksonville, Ill.

4. A Danger in the Use of Jequirity Heretofore Unmentioned, by T. E. Murrell, Little Rock, Ark.

5. Enucleation in Panophthalmitis, by J. E. Sinclair, Nashville, Tenn.

6. Functional Nervous Diseases, by A. R. Baker, Cleveland, O.

7. Sympathetic Ophthalmia, by C. M. Hobbey, Iowa City, Iowa.

8. Report of a Case of Sympathetic Inflammation Two Weeks after Enucleation of the Injured Eye, by Geo. H. Goode, Cincinnati, O.

9. Tobacco; Its Effects upon the Eye-Sight, by Flavel H. Tiffany, Kansas City, Mo.

10. A Simple and Reliable Astigmometer, by F. C. Hotz, Chicago, Ill.

11. The Necessity for More Care in the Setting of Lenses when Prescribed for the Correction of the Eye Faults, by J. J. Chisolm, Baltimore, Md.

12. Some Observations on the Correction of Low Degrees of Astigmatism, by T. E. Murrell, Little Rock, Ark.

13. Progressive Hypermetropic Astigmatism, by W. T. Montgomery, Chicago, Ill.

14. A Clinical Study of a Series of Cases Exhibiting Slight Macular and Perimacular Changes, by G. E. de Schweintzi, Philadelphia, Pa.

15. Report of a Case of Transplantation without a Pedicle for Cicatricial Ectropion. Blepharoplasty by Wolf's Method, by J. Morrison Ray, Louisville, Ky.

16. Some Points Worthy of Consideration in the Operation for the Extraction of Cataract, by J. W. Wright, Columbus, O.

17. Case of Pemphigus of the Eyelids, by D. Emmett Welsh, Grand Rapids, Mich.

18. Tests of Visual Acuteness and the Standard of Normal Vision, by Edw. Jackson, Philadelphia, Pa.

19. (a) Report of a Case of Left Lateral Homonymous Hamianopsia Associated with a Wound of the Occipito-parietal Region of the Right Side of the Head.

20. (b) Exhibition of an Instrument for the Measurement of the Radius of Curvature of Lenses, by R. Tilley, Chicago, Illinois.

21. The Amblyopia of Strabismus, by Jno. F. Fulton, St. Paul, Minn.

22. The Increase of Blindness in the United States and the Importance of its Prevention, by J. L. Minor, Memphis, Tenn.

23. Eye Strain as a Cause of Headaches, by B. J. Baldwin, Montgomery, Ala.

24. The Full Correction of Hyperopia with Convex Glasses, by W. Franklin Coleman, Chicago, Ill.

25. Treatment of Conjunctivitis Granulosa, by Peter D. Keyser, Philadelphia, Pa.

26. A Case of Static Lenticular Astigmatism, Acquired by Long-Continued Use of Spectacles Having a Faulty Position, by George Frothingham, Detroit, Mich.

27. (*a.*) Hæmorrhage after Cataract Extraction; (*b*) Boracic Acid and Massage in Pannus, by C. R. Holmes, Cincinnati, O.

INTERNATIONAL MEDICAL CONGRESS.

Section of Ophthalmology.

The following papers have, so far, been entered on the programme:

Manz (Freiburg). The congenital coloboma of the optic nerve.

Raehlmann (Dorpat). Demonstration of microscopical slides on "sclerosis of the retinal" arteries as the cause of sudden blindness.

John Weeks (New York). The pathology of acute contagious conjunctivitis.

A. Knapp (New York). On the treatment of the capsule during and after extraction.

Nieden (Bochum).

1. Agoraphoby and restriction of the visual field.
2. Demonstration of a self-registering perimeter.

Lyder Borthea (Frondhjem). Exhibition of an ophthalmoscope.

Pflüger (Bern). Ophthalmometrical observations.

Chibret (Clermont-Ferrand). The geographical distribution of trachoma; relative immunity from varicella.

(Formation of an international society of ophthalmological geography).

Fuchs (Vienna). The origin of pterygium.

Laqueur (Strasburg). Case of binocular embolic iridocyclitis after influenza.

Swan M. Burnett (Washington).

1. Racial influence in the etiology of trachoma.

2. A metric system of numbering and measuring prisms, with exhibition of an instrument for testing prisms.

Cohn (Breslau).

1. On photographing the interior of the eye.
2. On pernicious myopia.

Nuel (Liège). Demonstration concerning the endothelium of the anterior chamber of the eye.

NEWS.

THE DEATH OF DR. HENRY S. SCHELL.—Dr. Henry S. Schell, of this city, died of chronic Bright's disease on Saturday, March 15, 1890, at San Diego, California.

After taking the degree of A.B. and A.M. he was graduated from the Medical Department of the University of Pennsylvania in 1845, became resident physician at the Episcopal Hospital, and first lieutenant and assistant surgeon U. S. A., 1861. In 1862 he was selected a medical inspector, Centre Division of the army of the Potomac, and in 1863 medical inspector, Department of the South, U. S. A. He was brevetted captain and major U. S. A. March 13, 1866, for faithful and meritorious services during the war, and lieutenant colonel, September 28, 1866, for meritorious and distinguished services at Tybee Island and Savannah, Ga., when cholera prevailed.

Dr. Schell was a member of the Loyal Legion, of the Union League, of the Philadelphia College of Physicians, of the Academy of Natural Sciences, of the American Ophthalmological Society and other associations.

The funeral took place at the Church of the Assention, the body being cremated at Germantown.

The editor of this journal announces to his friends, that he has removed his office to 3036 Locust street.

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

THE USE OF FLUORESCEIN AS A MEANS OF DIAGNOSING LESIONS OF THE CORNEA.

BY R. L. RANDOLPH, M. D.,

Assistant Ophthalmic and Aural Surgeon to the Johns Hopkins Hospital and Dispensary.

A paper read before the Johns Hopkins Hospital Medical Society, March 3, 1890.

In the November and December numbers of the *Centralblatt f. praktische Augenheilkunde*[1] is to be found an article by Dr. Thomalla, of Friedland, on coloring the cornea with fluorescein, as a means of diagnosing or detecting lesions of this portion of the eye. According to the author, Dr. Straub, a Netherland army surgeon, first discovered the fact that a solution of fluorescein, when dropped upon a portion of the cornea which was deprived of its epithelium, would color this spot a deep green and leave the rest of the cornea unchanged.

For the past two months in the eye clinics of the Johns Hopkins Hospital and the Presbyterian Eye and Ear Charity Hospital, I have been testing the value of this method of diagnosing corneal lesions. The experiments numbered over a hundred and have led me to positive conclusions.

Fluorescein is a red powder soluble in water and belongs to

[1] Ueber die Faerbung der Erkrankten Hornhaut mit Fluorescein und die Verwerthung dieser Faerbung bei Stellung von Diagnosen und Differential Diagnosen. Von Dr. Thomalla in Friedland, "Centralblatt f. prak. Augenheilk.," November u. December, 1889.

that class of substances which are found as products of coal tar distillation. I employ a solution of 10 grains of the powder to the ounce of water, to which is added 15 grains of the bicarbonate of soda.

I have never known the solution to have an irritating effect, and I have used it in the most intense forms of corneal inflammation. The portions of the cornea stained retain the color from half an hour to several hours. The solution produces not the slightest impression upon the healthy cornea. I have always found that when positive defects in the corneal epithelium existed, in other words where there was actual loss of substance, the coloration was more apparent. So long, then, as it is possible to color any portion of the cornea, we may be certain that some lesion still exists. In excoriations of the cornea positive results were the rule. One case I remember particularly where the cornea had been scratched by a blow from a twig, and where the extent of the excoriation was scarcely visible to even oblique illumination. Every detail of the wound and every minute point, where the epithelium had been removed, was clearly brought out by a drop of the fluorescein solution. In ulcers of the cornea positive results were always obtained. In simple superficial keratitis the coloration was much less distinct than when this disease was associated with an ulcer. In parenchymatous keratitis the results were invariably negative. In three cases of iritis uncomplicated with corneal trouble I failed to obtain any coloration. In two other cases of iritis of syphilitic origin where the cornea was involved, superficially as well as interstitially, marked coloration was observed. In two cases of acute glaucoma the result was absolutely negative.

In foreign bodies in the cornea no matter how small the foreign substance was, its position and size was located to a nicety. Here the coloration was immediate and distinct, showing itself by a green ring just around the foreign body. In phlyctens of the conjunctiva the color was rather yellow than green. Only in those cases where the phlycten was located on the limbus of the cornea and the latter had been

involved to some extent, was there any positive green coloration to be seen. Pterygia and pinguiculæ gave negative results. With the exception, then, of phlyctenular conjunctivitis, the solution is inapplicable to any of the other forms of conjunctival inflammation. As to the value of the solution as an aid in diagnosing such a disease as glaucoma, an interesting example of which Dr. Thomalla gives in his paper, I am unable to speak except from a negative point of view, as I have only experimented upon two cases. Whether in a series of cases of supposed acute glaucoma or where an attack of glaucoma is thought to be imminent, this solution will reveal disturbances in the cornea which so frequently attend this disease, and thus establish the diagnosis, I have very grave doubts. I have yet to see the cornea of an eye affected with acute glaucoma take on any coloring whatever. And furthermore, I have never observed any distinct coloring of the cornea, unless there exist some lesion or defect in the anterior epithelial layer. That cases of glaucoma do often occur where not only the anterior epithelium but the entire cornea is involved, is a well-known fact, and I am sure that such cases would take up the coloring matter. But it is quite evident that in this class of cases the solution would have no diagnostic value.

I think then that when one is accustomed to the use of the solution, in other words understands that where the coloration is produced the anterior epithelium is involved, the agent is of value in detecting, with accurracy, lesions of this part of the cornea. Ulcers so small that it is impossible to see them by diffuse daylight, are brought out with perfect distinctness, quite as clearly indeed as under oblique illumination, and I can readily believe that small points, which it is possible to overlook even with the oblique illumination, would invariably be revealed by a drop of the solution and, moreover, in half the time that it takes us to subject a patient to the former method. In minute ulcers of the cornea in very young children, where the blepharospasm and photophobia are frequently so intens, that the lids have to be forced apart in order to get

a view of the eye-ball, and then the latter is rolled about so continuously and the cornea flits so rapidly before our eyes, that we are obliged to simply infer from the attendant symptoms the nature of the trouble without actually seeing the lesion itself, a drop of the solution will locate the disease and its extent, and bring it out distinctly so that it can be seen, no matter how fast the eye-ball moves about. In such cases I am inclined to think that the fluorescein solution will be a help in establishing a diagnosis. I am using the solution every day and find it useful in bringing to light lesions of the cornea so small as to be readily overlooked in the hurry of a crowded clinic. Clinical experiments seem to show that positive results are only to be seen when there is some lesion or break in the anterior epithelium of the cornea. Troubles beneath the corneal surface give vague and hence unreliable results. Two of my colleagues on the staff of the Presbyterian Eye and Ear Hospital, Drs. Harlan and Woods, have been co-operating with me in trying the solution, and their views coincide entirely with mine.

I find in experiments on animals that if I simply rub the cornea gently with my fingers two or three times, enough epithelium is removed to show marked coloration on instillation of the fluorescein. This fact, no doubt, explains why slight insults to the eye-ball are attended with so much pain. However slight the mechanical force employed, a layer or two of epithelium has been removed, and hence the lachrymation, pain and all the symptoms of ciliary irritation. On scratching the cornea with a pin and dropping the solution upon the wound, the green coloration makes its appearance along the line of the scratch and from this line diffuses itself into the surrounding tissue. The deeper the scrach the further will the green color spread itself out into the cornea, and in some cases I have seen almost the entire cornea colored green. This tendency to diffusion of the coloring substance is far less marked if seen at all in inflammations involving the anterior epithelium. In ulcers, for example, it matters little how often the solution is dropped upon the ulcer, the green color re-

mains at the seat of the ulcer, and shows no disposition to spread itself to remote parts of the cornea, and I think the reason is because around the margin of the ulcer all the entrances into the interlamellar canals and lacunæ are blocked up or infiltrated with round cells and leucocytes, and hence a mechanical obstruction is offered to the passage of the fluorescein out into the healthy tissue. When a healthy cornea is scratched, many of these canals are cut across and the divided ends remain open, and into these openings passes the fluorescein solution just as water does into the interstices of a sponge.

If the solution of fluorescein be placed upon the cornea of a recently killed animal, a diffuse greenish color of the cornea is produced as soon as the corneal epithelium becomes loosened and macerated, a change which, as is well known, makes its appearance in a short time after death. This reaction then is an interesting test of the onset of these early post mortem changes in the corneal epithelium.

I have examined microscopial sections of the fresh corneæ of animals which have been scratched or injured so as to bring out the characteristic color with fluorescein. It is necessary to examine these sections, which were made from the frozen cornea, without the addition of water or salt solution, as this rapidly extracts the color. In frozen sections of the injured cornea, colored before removal of the eye with fluorescein, it is observed that the color, which, by transmitted light, has a reddish hue, is diffuse and shows no especial affinity for definite histological elements in the living cornea such as the nuclei of the cells.—*Johns Hopkins Hospital Bulletin.*

BILATERAL ORBITAL GUMMATA.

BY T. C. EVANS, M.D.,

Demonstrator of Anatomy in the Hospital College of Medicine, Visiting Surgeon to the Eye and Ear Department of the Louisville City Hospital, Louisville, Ky.

Susan B., colored, æt. 29 years, came to my office October 17, 1889, suffering from binocular exophthalmia, the left eye being the most prominent; the globe, together with its mass of hypertrophied conjunctiva, protruding far beyond the free margin of the lids, impinging on the nose and hanging well down upon the cheek. The cornea had become dry and shrunken from exposure, and looked like a horny crust adhering to the superior and outer portion of the protruding mass. The tumor was freely movable, there being no adhesions either between the conjunctiva and globe or between the lids and the mass. The globe could be easily defined; the tension was apparently normal. The right eye was pushed forward and slightly outward; the inferior cul-de-sac was obliterated by a roll of hypertrophied conjunctiva; the lower lid was everted and pushed downward by this mass of tissue, which was covered by a hard, thick crust formed by dessicated mucus and conjunctival secretions. The pupil was dilated *ad maximi.* The cornea was quite hazy from exposure. It was impossible to get a distinct image of the fundus. Enough, however, could be made out to ascertain that the retinal vessels were engorged, but not tortuous, showing that whatever produced the exophthalmus did not exert much pressure on the optic nerve. The upper lid was œdematous, with a tendency to ptosis. The protrusion was too great on the lids to completely shield the cornea, which was already hazy, as before stated. Vision was still fairly good; by holding the lids open with her hand she could count fingers at fifteen feet. The line of the protrusion was a little external to the normal axis in each eye, but the deviation was not marked, as is usnally the case in orbital tumors. Examination of the nasal cavities, vault of the pharynx, antri and frontal sinuses yielded nega-

tive results. The ocular movements were necessarily much restricted from the degree of the protrusion, but no paralysis could be detected. Aside from being a bilateral affection, there was nothing characteristic about the exophthalmus, and no evidence of malignant or specific complications. The hypertrophied conjunctiva and connective tissue, the edema of the lids, together with the other symptoms, were all the natural belongings of ptosis from any cause. The accompanying cut (1), made from a photograph, shows tolerably well her condition, except in the right eye the size and shape of the conjunctival mass is not distinctly shown. The protrusion of the right eye was also much greater than would appear from the cut. The patient stated that she had first noticed the trouble about six months previous to the time she came to me, but had never had it examined or treated at all, and that both eyes were affected simultaneously. She was ignorant and indifferent, so that an intelligent history could not be obtained. There was a slight enlargement of the thyroid gland, the enlargement being more perceptible to touch than to sight. There was no disturbance of the heart's action, either in rhythm or frequency. Her general health was apparently good; her appetite was good, and she was well nourished. She admitted having had syphilis ten years ago. She had one child, nine years old, which had congenital syphilis. She also had had a number of abortions. There were also traces of syphilitic lesions in the pharynx. Taking into consideration the fact that the affection was bilateral, the extent and direction of the protrusion, the absence of pain, the normal position of the retinal vessels, together with the slight enlargement of the thyroid gland, I made a diagnosis of exophthalmic goitre, notwithstanding the fact that there was entire absence of all cardiac symptoms, which Flint says is the only constant symptom in the disease. Either the hypertrophy of the gland or the exophthalmus may be wanting, but the heart symptoms never. Neither was there any retraction of the upper lids, nor was there any nervous excitement or dyspnœa. As the case seemed quite a unique one, I showed it to two other ophthal-

mologists, both of whom concurred in my diagnosis. I sent the patient to the City Hospital, where, on October 20, I enucleated the left eye. After enucleating the eye I took a strong pair of scissors and excised the pendulous mass of conjunctival tissue which hung from the inferior cul-de-sac down upon the cheek. I then seized the mass in the right eye with my fixation forceps, and, dissecting it up from the sclera, removed it entirely. After the mass was removed I tried to close the wound in the conjunctiva with sutures, but the membrane was so badly disorganized from exposure that the stitches would not hold; so I left it to heal by granulation. Both eyes were dressed with compresses and roller bandage. Chloroform was the anæsthetic used, which she took without a single unfavorable symptom. This was another point against the diagnosis of exophthalmic goitre, as it is well known that patients suffering from this disease take all anæsthetics badly. While I am a firm believer in the superiority of chloroform over all other anæsthetics, I confess to have given it in this case with much fear, if not trembling. The patient was not given any treatment except a hypodermic of morphine. On removing the dressing, forty-eight hours after the operation, I found the discharge from the left orbit very profuse and offensive. After cleansing out the cavity I pressed my finger into the orbit. Instead of the uniform hypertrophy of the adipose cellular tissue of the orbit, together with the engorged and dilated blood-vessels, I found a distinct and well-defined tumor about the size and shape of a small almond, and occupying the space between the entrance of the optic nerve and the inner canthus. It was of a yellowish white color; the outer portion was hard and fibrous, and contained a few blood-vessels. It was movable, and had no connection either with the periosteum or the lids, but seemed to lie embedded in the connective tissue of the orbit. No attempt was made to remove the growth, except a small section for microscopic examination. The protrusion of the right eye had not been lessened by the pressure, though the haziness of the cornea had disappeared while the eye was closed. From the gross appearance of the tumor in

the left orbit I was convinced that, instead of an atypical case of exophthalmic goitre, I had to deal with a case of syphilitic gummata of the orbit. She was ordered iodide of potassium, beginning with twenty grains three times a day. In forty-eight hours there was quite a perceptible improvement. The exophthalmus of the right eye was lessened, the tumor of the left orbit was smaller, while the œdematous condition of the lids had disappeared rapidly. The dose of the iodide was steadily increased, until on the tenth day she was taking ninety grains three times a day. The improvement was now so rapid that I did not think it necessary to further increase the dose. The maximum dose of ninety grains, however, was kept up as long as she stayed in the hospital, without any gastric disturbance or any symptoms of iodism. The pupil remained dilated after the exophthalmus had disappeared. It contracted readily on the instillation of eserine, and did not again dilate when the drops were discontinued. The long-continued exophthalmus and œdema produced an atonic condition of the right upper lid, which resulted in entropion after the parts assumed their normal proportions. To relieve this I removed an elliptical fold of the integument and united the wound with sutures.

Cut No. 2 represents the condition of the patient when she was discharged from the hospital, just one month after the operation. I submitted the specimen to Dr. Dugan for microscopical examination. He reports as follows:

"*Dear Dr. Evans:* The tissue you sent me to examine I found macroscopically to be of a yellowish-white color and very soft. Microscopically the outer part of the tissue presented a distinctly fibrillated matrix filled with round cells, while the central or inner part was made up largely of granular matter, with some fat granules, shrunken cells, and poorly outlined bands of fibrous tissue.

W. C. DUGAN, M.D."

In making a hasty review of the literature of the subject, I have been unable to find a reported case of bilateral gummata

of the orbit. Dr. W. W. Seeley reported a case of gummy tumor of the left orbit to the American Ophthalmological Society in 1885, with microscopic specimens of the growth. The diagnosis, however, was not made until the eye was enucleated. Dr. Tangeman, of Cincinnati, reported a case in 1887 (*Lancet-Clinic*) of gummy tumor of the right orbit. In his case diagnosis was made early, and by vigorous course of treatment the eye was entirely restored. Very few of the text books, either on diseases of the eye or on syphilis, even mention the subject. Those that do mention it dismiss the subject in a few words. Dr. Noyes merely says: "As to gummy tumors growing in the orbits, nothing special need be said; that their bulk must displace the eye-ball and that they may otherwise interfere with its functions is self-evident." Nettleship says: "Nodes in the orbit (whether celluar or periosteal) occur but rarely." Loring says: "I never met with a case of exophthalmus dependent on this cause during my many years' connection with the New York Eye and Ear Infirmary." Alexander, in his report of 4,383 cases of syphilis of the eye and its appendages ("Syphilis und Auge," Wiesbaden, 1889), does not report a case of orbital gummata. I have kept the case under observation since her dismissal from the hospital. Up to this time (January 15, 1890) there has been no return of the growths. The movements of the left eye are normal; the pupil responds readily to light; the haziness has entirely disappeared from the cornea and vision is normal.—*The American Practitioner and News.*